

ANNUAL SITE INSPECTION REPORT

BAILEY SUPERFUND SITE ORANGE COUNTY, TEXAS

AUGUST 23, 1999

**PREPARED BY: BROWNING-FERRIS, INDUSTRIES
OF NORTH AMERICA**

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AUGUST 23, 1999

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SECTION 1

1.0 Introduction

Joe Whelan of Browning-Ferris Industries of North America (BFI) conducted the annual inspection of the Bailey Site on August 23, 1999. The inspection was conducted in accordance with the Final Inspection, Maintenance, and Monitoring Plan (prepared by Parsons ES and GeoSyntec, September 1997). The following BSSC technical committee members were present for the inspection: Chuck Orwig and Lou Levi. Rodney Townsend, the property owner, was also present during the inspection.

An inspection checklist was developed to aid in the inspection and is included in Appendix A. The checklist was completed as the entire site was walked and observations were made. Any areas of concern that were observed during the inspection were noted and located on a site map which is included in Appendix B. (For reference, a map from the August, 1998 inspection has also been included in Appendix B.) Photographs were taken during the inspection and are presented in Appendix C. A summary of the inspection is presented in Section 2.

SECTION 2

2.0 Inspection Summary

The annual site inspection was performed on August 23, 1999 by Joe Whelan representing BFI (general contractor), members of the Bailey Site Settlers Committee, and Rodney Townsend, the site owner.

2.1 Grounds Inspection

The North and East Dike areas were inspected by traversing the surface area of each dike and thoroughly looking for signs of problems that would affect the integrity of the geosynthetic lightweight cap system. The vegetative cover was generally found to be in good condition. The August 1998 inspection report noted several areas of minor water ponding located between the access road and the inner slope of both the East and North cells. These areas were formed as a result of placement of the access road on the cap slope, and due to isolated minor cap settlement. These areas have been backfilled with clean off-site topsoil, fertilized and seeded with Bermuda grass, as part of the ongoing maintenance of the site's routine post-closure care. No areas of ponding were noted during this inspection.

In general, bermuda grass growth at the site is vigorous, however, there were two areas where additional seeding was recommended: 1) along the northern edge of the north cap adjacent to the existing rip-rap, and 2) along the south end of the east cell. These were areas where vegetation was established, but additional seeding would be beneficial. All areas requiring reseeding were flagged during the August 23rd inspection.

2.2 Dike Breaches and Drainage Pipes Inspection

The two breaches in the North Marsh perimeter dike were inspected. The breach located at the southeastern end of the North Dike has been closed by placement of inert fill material. This action was approved by USEPA Region VI (see attached correspondence - Appendix D). There was no observed effect on the water quality, flora or fauna noted during this inspection. The other breach located northeast of the North Dike had a normal flow. A moderate incoming tide occurred from the culvert located at the southwest corner of the East Dike. The drainage pipes in the former laydown area and at the eastern end of the East Dike were found to be in good condition with no obstructions present.

2.3 Fence and Sign Inspection

The length of the fence was walked and observed to be in good condition. The gates and locks were inspected and found to be in good working order. One sign had fallen from the east fence at the mid point of the East Dike. All signs located on poles at the site have been retrofitted with steel bracing to prevent damage from wind shear. This activity occurred as a preventive measure prior to the 1999 winter season. All pole mounted signs were in good condition at the time of the inspection.

2.4 Site Access Bridge Inspection

The site access bridge was previously inspected and found to be in need of retrofitting due to deterioration of the wooden upper decking. Please see Appendix E which provides a scope of work for the bridge repair. These repairs are expected to be completed before the end of October 1999.

2.5 Road Inspection

The access roads on the North and East Dikes were inspected for signs of rutting, potholes, erosion, and accumulation of silt. The roads were found to be in good condition.

2.6 Other Observations

Overall the site was deemed to be in good condition. There were some isolated areas of stressed vegetation on the caps that were attributed to seasonally high temperatures and low rainfall.

SECTION 3

3.0 Summary of Problem Areas and Recommended Actions

Areas of concern observed during the August 1999 Annual Site Inspection included small areas of stressed vegetation located primarily along the north side of the North Dike and the southern end of the East Dike.

Table 3.1 on the following page describes the areas of concern observed during the 1998 annual site inspection and lists recommendations for corrective action, which has since been completed.

**TABLE 3.1 from 8/98 Inspection
(modified to include follow-up Reponse Actions performed)**

The following table was originally presented in the August 1998 Quarterly Inspection Report. Comments have been added (as "Action No. _") in the text below to identify the response actions taken in the previous year to address the Observations and Recommendations noted in the 8/98 Report.

Observation No. 1

The areas of differential settlement on the North and East Dike protective soil layer within the limits of the lightweight geosynthetic cap system.

Recommendation No. 1

Place six inches of topsoil in areas where differential settlement was noted to occur. Reseed areas with bermuda grass or a bermuda/rye mixture, depending on growing season recommendations. Add fertilizer at the rates shown on the attached soil test report from the Texas Agricultural Extension Service.

Action No. 1

Completed December 13 & 14, 1998. Placed approximately 880 yards of top soil in areas noted on map, fertilized and reseeded. Also, fertilized and reseeded South end of East Cell. Returned on April 13 & 14, 1999 with 67 yards topsoil from off-site, and distributed all stockpiled topsoil, fertilized and seeded. This was performed due to settling of topsoil placed during December.

Observation No. 2

The area of differential settlement in the rip-rap material located on the southcentral side of the North Dike.

Recommendation No. 2

Redistribute rip-rap material with a rubber tire backhoe to establish a consistent slope.

Action No. 2

Completed December 14, 1998. Redistributed and added rip-rap from stockpile.

Observation No. 3

Missing signs on the North and East Dike areas.

Recommendation No. 3

Attach existing signs to the applicable poles.

Action No. 3

Completed January 4, 1999. All signs removed, braced with steel and remounted.

Observation No. 4

Road shell at west end of North Dike channeled due to rainfall runoff.

Recommendation No. 4

Eliminate erosion potential by spreading shell out with tractor boxblade and placement of fill in areas of differential settlement.

Action No. 4

Completed December 14, 1998.

Observation No. 5

The East Dike was partially mowed prior to the inspection due to recent heavy rainfall events.

Recommendation No. 5

Complete the mowing event as weather permits.

Action No. 5

Routine mowing events are ongoing.

Observation No. 6

Areas where vegetation needs to be stimulated.

Recommendation No. 6

Add fertilizer and seed to these areas when placing topsoil to correct differential settlement. (See Recommendation No. 1 above)

Action No. 6

All noted areas were reseeded and fertilized after placement of the top soil. Areas of stressed vegetation noted during the 1999 annual inspection will be addressed in the near future.

STATEMENT OF CERTIFICATION

Based on the information and data presented within this report, the following statement is made:

" I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Certification of conditions by a professional engineer is a declaration of his professional judgment. This certification is based on normal engineering practice and cannot be construed as a warranty.



Handwritten signature and date: 9/21/99

APPENDIX A
ANNUAL SITE INSPECTION CHECKLIST

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BAILEY SITE INSPECTION CHECKLIST

Inspection Date: August 23, 1999
Inspection Time: 9:00 AM
Name of Inspector: Joe Whelan
Weather Conditions: Sunny, Mid 90's

Ground Inspections

Condition of Vegetation:

Grass Height 6 inches
Color Green/Tan
Fullness Full to Partial
Areas of Concern ☒ Yes ☐ No
(if yes Detail on Map)

Signs of Erosion: Yes ☒ No
(if yes detail location on map and note average depth and width)

Exposed Geosynthetics: Yes ☒ No
(if yes provide location on map and note if its the geocomposite drainage layer, 60 mil HDPE liner, or geosynthetic clay liner)

Signs of Differential Settlement: Yes ☒ No
(if yes provide location on map noting estimated depth and width)

Ponding Greater than 2" in Depth: Yes ☒ No
(if yes, provide location on map noting depth)

Evidence of Prolonged Ponding: Yes ☒ No

Estimated date of last rain event: 2 weeks, < 1 inch

Gas Vents:

Condition of Barrier: good

Condition of Piping: good

Screens intact: ☒ Yes ☐ No
(if no to any provide details on map)

Riser Pipe Plumb: ☒ Yes ☐ No

BAILEY SITE INSPECTION CHECKLIST

Condition of Dike Breaches and Drainage Pipes

Verify that each allows free drainage:

Pond A culvert at South end of East Dike:	<u>Yes</u>	No
Site Entrance Area (Non-capped Area):	<u>Yes</u>	No
Perimeter Dike Breach in Pond A:	Yes	<u>No</u>
Perimeter Dike Breach in North Dike:	<u>Yes</u>	No

If the answer was No to any of the above, describe the obstruction:

This breach was filled in with inert material.
See narrative.

Fence and Sign Inspection

Chain Link Fencing

Signs of unauthorized entry:	Yes	<u>No</u>
Fence Damage:	Yes	<u>No</u>
Corrosion:	Yes	<u>No</u>
Barb Wire Damage:	Yes	<u>No</u>

Gates & Locks in good condition: Yes No

Overhang Extensions

Signs of unauthorized entry:	Yes	<u>No</u>
Signs of damage:	<u>Yes</u>	No

Signs

Verified all signs:	<u>Yes</u>	No
Signs on all gates:	<u>Yes</u>	No

Provide location of any damage on the map. Describe below any damage to the fence or signs:

The overhang Extensions located on the outer most
bridge Access gate should be welded to the bridge
at a 90° angle. One sign was down on the east fence.

BAILEY SITE INSPECTION CHECKLIST

Site Access Bridge

Are the following in good condition:

Wood Decking	Yes	<input checked="" type="radio"/> No
Hand Rails	<input checked="" type="radio"/> Yes	No
Approaches	<input checked="" type="radio"/> Yes	No
Bridge Steel Structure	<input checked="" type="radio"/> Yes	No

If no, describe the observed condition:

Wood decking deteriorated - Contract to
retrofit bridge, handrails, etc. is pending.
See Appendix E.

Road Inspection

Rutting	Yes	<input checked="" type="radio"/> No	(if yes to any provide location on location on map)
Potholes	Yes	<input checked="" type="radio"/> No	
Erosion Channeling	Yes	<input checked="" type="radio"/> No	
Accumulation of Silt	Yes	<input checked="" type="radio"/> No	

Other General Site Observations:

General site conditions are good. Access
bridge to be repaired.

BAILEY SITE INSPECTION CHECKLIST

Summary of Problem Area Identified

- 1.) Stressed Vegetation (TAN/SPARSE) located at various small plots along North side of North cell adjacent to Rip Rap, and at south west end of East cell. All locations flagged for reseeding.
- 2.) Bridge to be repaired & fence "wings" rewelded
- 3.) Sign fallen from fence east of East cell at mid point.

Joe Whelan
Inspector's Signature

8-23-99
Date

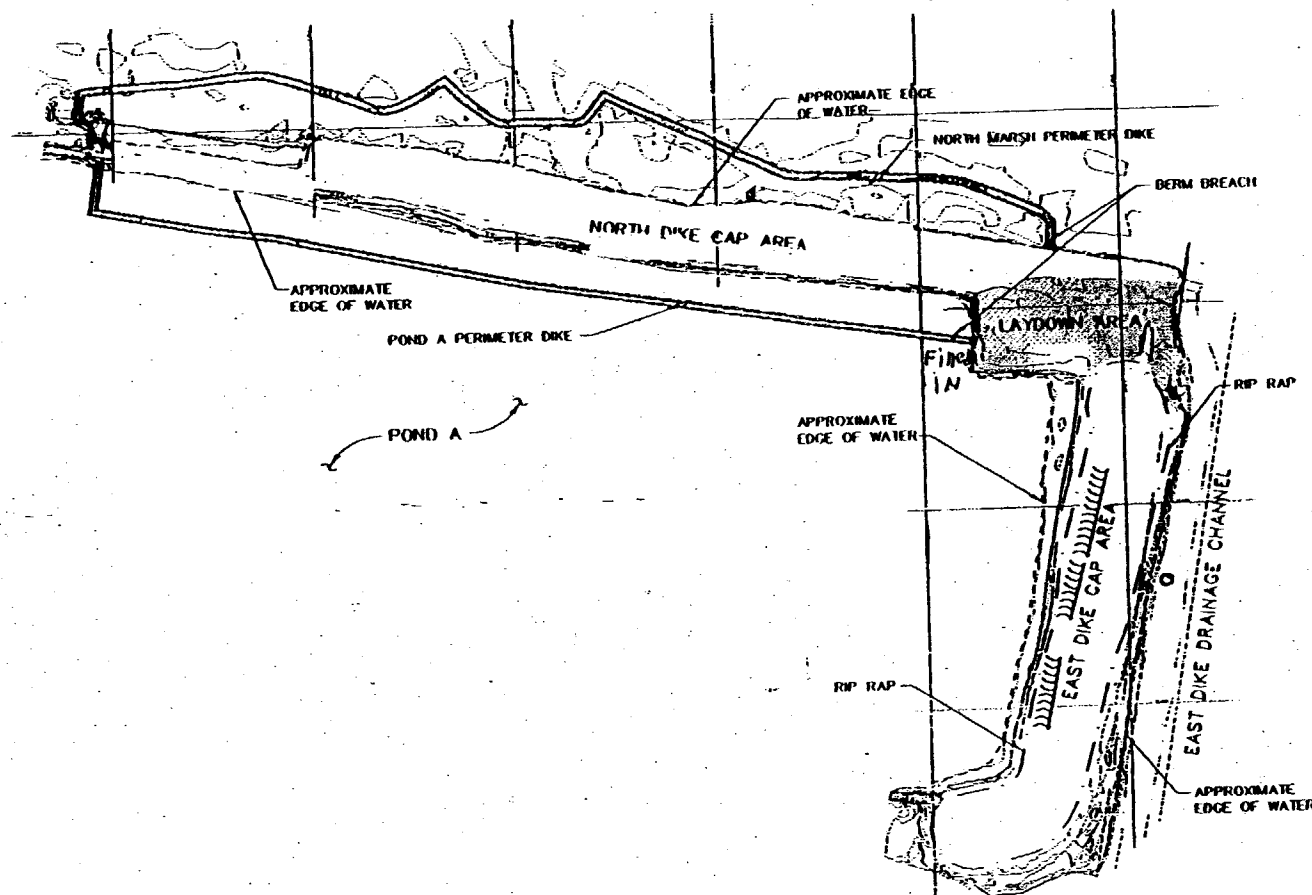
APPENDIX B

SITE MAPS

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NORTH MARSH



1. DRAWING BASED ON PREVIOUS SITE TOPOGRAPHIC INFORMATION AND DESIGN DRAWINGS. DRAWING IS NOT BASED ON FINAL AS-BUILT DATA.
2. LOCATION OF EDGE OF WATER SHOWN IS THE LOCATION AT THE TIME OF SURVEY. WATER LEVELS SUBJECT TO TIDAL VARIATIONS. AVERAGE TIDE ELEVATIONS ARE: LOW TIDE, -2.0 FEET (MSL) AND HIGH TIDE +1.0 FEET (MSL). TIDE ELEVATIONS ARE SUBJECT TO VARIATION DEPENDING ON SEASON AND LOCAL WEATHER CONDITIONS.
3. RIPRAP LOCATED ON ALL SLOPES.
4. INSPECTION AREA TO INCLUDE, AS A MINIMUM,

- NORTH DIKE CAP AREA
- EAST DIKE CAP AREA
- ALL AREAS OF RIP RAP
- VISUAL OBSERVATION OF PERIMETER DIKES
- ACCESS BRIDGE
- SITE FENCING (FIGURE 2.2)

LEGEND - GENERAL

EXISTING CONTOUR (FEET)

ANCHOR TRENCH

APPROXIMATE LIMIT OF
GRAVEL SURFACING

Missing sign = 0

A horizontal scale bar with vertical end caps. The number '0' is at the left end and '30' is at the right end. Below the bar, the text 'SCALE IN FEET' is written in all caps.

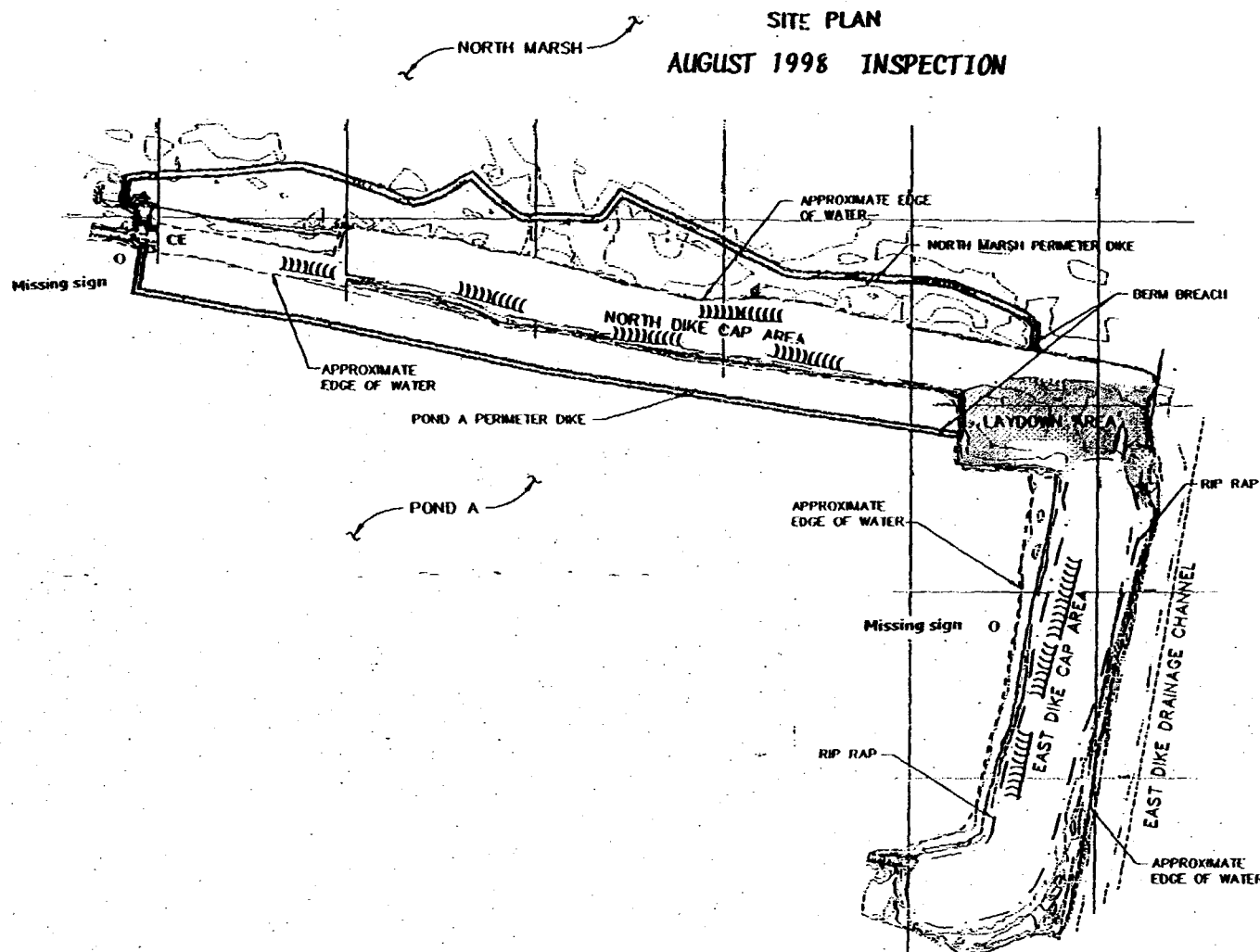


GEO SYNTEC CONSULTANTS

ATLANTA, GA

PROJECT NO. GE3913-620	FIGURE NO. 2.1
DOCUMENT NO.	FILE NO. 3913F004

SITE PLAN AUGUST 1998 INSPECTION




NOTES:

1. DRAWING BASED ON PREVIOUS SITE TOPOGRAPHIC INFORMATION AND DESIGN DRAWINGS. DRAWING IS NOT BASED ON FINAL AS-BUILT DATA.
2. LOCATION OF EDGE OF WATER SHOWN IS THE LOCATION AT THE TIME OF SURVEY. WATER LEVELS SUBJECT TO TIDAL VARIATIONS. AVERAGE TIDE ELEVATIONS ARE: LOW TIDE - -2.0 FEET (MSL) AND HIGH TIDE +1.0 FEET (MSL). TIDE ELEVATIONS ARE SUBJECT TO VARIATION DEPENDING ON SEASON AND LOCAL WEATHER CONDITIONS.
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 - ALL AREAS OF RIP RAP
 - VISUAL OBSERVATION OF PERIMETER DIKES
 - ACCESS BRIDGE
 - SITE FENCING (FIGURE 2.2)

LEGEND - GENERAL

- EXISTING CONTOUR (FEET)
- ANCHOR TRENCH
- APPROXIMATE LIMIT OF GRAVEL SURFACING
- Channel Erosion = CE
- Missing sign = O
- Area of possible Differential Settlement

0 300
SCALE IN FEET

 GeoSYNTEC CONSULTANTS ATLANTA, GA	
PROJECT NO. GE3913-620	FIGURE NO. 2.1
DOCUMENT NO.	FILE NO. 3913F004

APPENDIX C

PHOTOGRAPHS

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**This Document Contained
Material Which Was Not
Filmed/Scanned**

Title Bailey Waste TXD 980864649

Site Inspection Photos

**Please Refer to the File in
Superfund Records Center**

APPENDIX D

USEPA LETTER OF APPROVAL

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 6

1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

June 30, 1999

VIA REGULAR MAIL AND FACSIMILE

Ms. Debra L. Baker
Legal Counsel, Bailey Site Settlers Committee
Mayor, Day, Caldwell & Keeton, L.L.P.
700 Louisiana, Suite 1900
Houston, Texas 77002-2778

Re: Bailey Waste Disposal Site
Pond A Perimeter Dike Breach

Dear Ms. Baker:

This letter is in response to conversations with Ms. Kathleen Bethune of your office and Mr. Chuck Orwig of DuPont regarding the filling in of the Pond A perimeter dike breach (see enclosed figure). According to Mr. Orwig, the Pond A perimeter dike breach has been filled in by Mr. Rodney Townsend, the current property owner, in order to provide land access to the western part of his property. This matter has been discussed with Mr. Ron Gouguet the National Oceanographic and Atmospheric Administration. It is our opinion that the filling in of the Pond A perimeter dike breach will not prevent the free flow of tidal water into the diked area as long as the North Marsh Area perimeter dike breach is maintained.

The site's *Final Inspection, Maintenance and Monitoring Plan* (Parsons Engineering Science, Inc. and GeoSyntec Consultants, September 1997) requires that breaches in the perimeter dike to be cleared of accumulated silt, if free movement of water within the dike area is obstructed. This requirement is no longer applicable for the now filled Pond A perimeter dike breach. However, because the Pond A perimeter dike breach has been filled, the flow through the North Marsh Area perimeter breach will likely increase. The North Marsh Area perimeter dike breach should be monitored for potential erosional damage which could impact the integrity of the constructed remedy.

If you have questions, please contact me at (214) 665-6758.

Sincerely,

Chris G. Villarreal

Chris G. Villarreal.

Remedial Project Manager

Enclosure

Ms. Debra L. Baker
June 30, 1999
Page 2

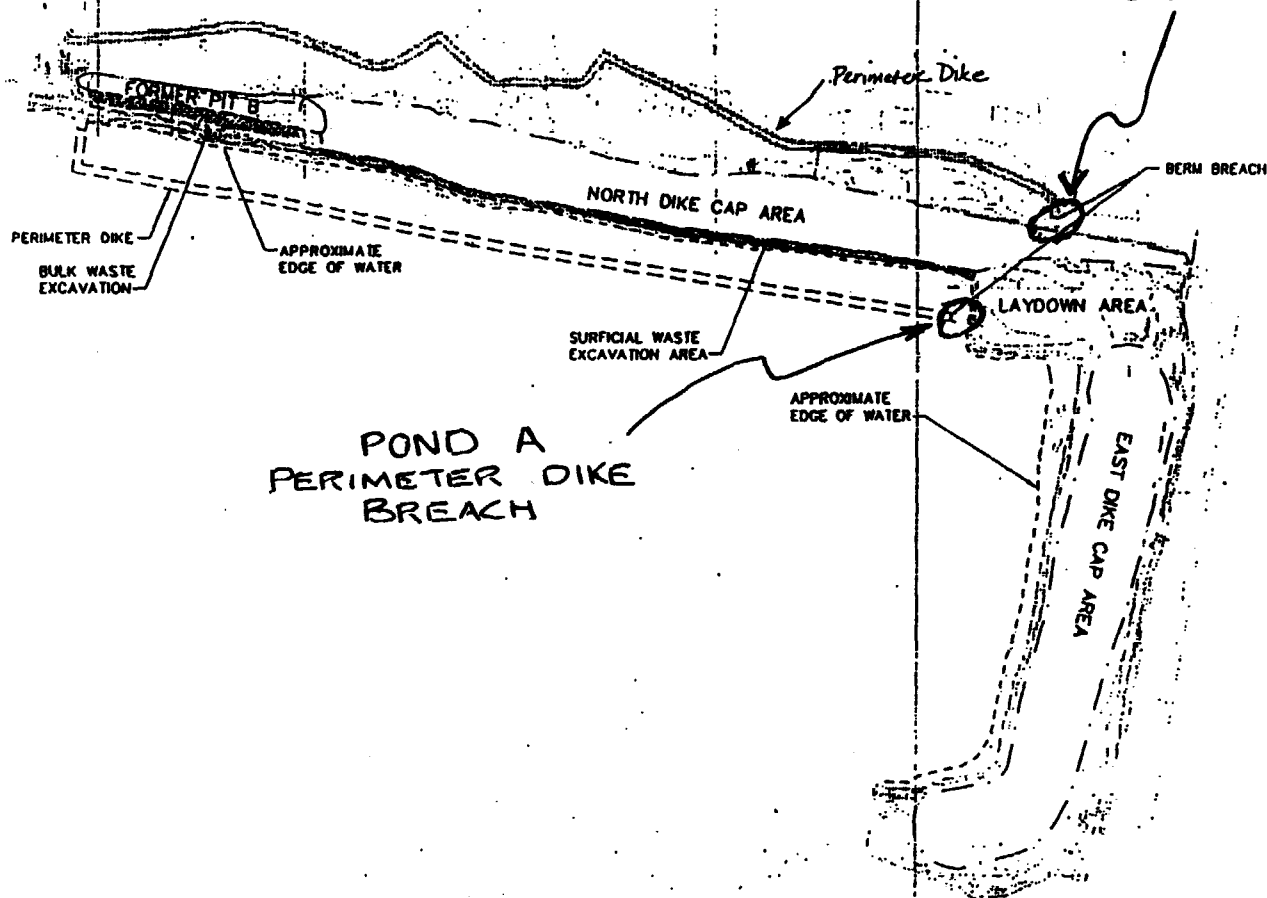
cc: Ron Gouguet
National Oceanographic and Atmospheric Administration

Chuck Orwig
DuPont

Rodney Townsend
Property Owner

SITE PLAN

NORTH MARSH AREA PERIMETER DIKE BREACH



NOTES:

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3. RIPRAP LOCATED ON ALL SLOPES.

LEGEND - GENERAL

	EXISTING CONTOUR (FEET)
	ANCHOR TRENCH
	APPROXIMATE LIMIT OF GRAVEL SURFACING
	BULK WASTE EXCAVATION AREA
	SURFICIAL WASTE EXCAVATION AREA

0 300
SCALE IN FEET



GeoSYNTEC CONSULTANTS
ATLANTA, GA

PROJECT NO. GE3913-820	FIGURE NO. 1
DOCUMENT NO.	FILE NO. 3913F802

APPENDIX E

BRIDGE REPAIR WORK PLAN

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SCOPE OF WORK FOR BAILEY SITE BRIDGE REPAIRS

I. PROJECT DESCRIPTION

Project: Bailey Site Bridge
Location: Approximately 3 miles southwest of Bridge City in Orange County, Texas, on Highway 87 at the Rainbow Bridge.

In 1992, a single span bridge was constructed to provide construction access for remediation activities at the Bailey Superfund Site. The bridge consists of steel beam modular units with wooden decking. The bridge decking consists mainly of a double course of multi-ply wooden timber truck mats (typically used for oil field roads) secured to the bridge. Over time the wood decking has rotted and needs to be replaced. Proposals are requested for performing repairs to the bridge.

II. STATEMENT OF WORK

Provide all labor, materials and equipment necessary to perform repairs, remove and replace bridge decking as shown on the attached sketches and in conformance with the requirements for construction as presented below.

Bidders shall make arrangements with the owner (Mr. Joseph Whelan, Cecos International, 318-527-6857) to attend a mandatory pre-bid site visit at 10:00 AM on Tuesday July 20, 1999, at which time bidders shall have the opportunity to inspect and observe the existing conditions of the bridge.

III. REQUIREMENTS FOR CONSTRUCTION:

1. Construction shall be in compliance with Standard Specifications for Construction of Highways, Streets, and Bridges Adopted by the Texas Department of Transportation in 1993.
2. All existing timbers shall be stripped from the bridge and taken to a location on-site designated by the owner and neatly stacked.
3. Contractor shall notify the owner 48 hours in advance of completion of removing all wooden deck timbers so arrangements can be made for the bridge beams and framing to be inspected by the Engineer. Structural inspection of beams and framing must be completed prior to installing new bridge decking timbers.
4. Contractor must maintain site security fencing at all times during progress of work so that fence and warning signs are up at end of each day to prevent unauthorized personnel from gaining access to work area and the Bailey site.

5. Upon approval of structural inspection, Contractor shall proceed with jacking bridge beams up and removing bearing timber beams that existing steel beams bear on at each abutment end. Contractor shall replace old timbers with new preservative pressure treated timbers in accordance with Item 492. Contractor may propose alternate options such as forming and pouring concrete in lieu of replacing old timbers with new ones. If Contractor proposes an alternate means, Contractor shall provide to the Engineer a submittal for approval providing details of concrete mix design, and reinforcement details.
6. Contractor shall provide and install new galvanized bolts for connection of timber planks to steel diaphragm members. Contractor shall provide new 8 inch galvanized spikes for connection of transverse timber planks to longitudinal timbers.
7. Timber shall be in accordance with Item 491 (Timber for Structures). Timber shall be southern pine as specified in Item 491 or may be # 1 grade, in accordance with Southern Pine Inspection Bureau (SPBI) Specifications. Submittal and approval of mill certifications are required to verify grading.
8. Timber Preservative shall be in conformance with Item 492 (Timber Preservative and Treatment). Submittal and approval of plant certification is required to verify preservative treatment.
9. Transverse planks may be placed in lengths shorter than full width. Joints must be placed at the center line between adjacent girder units. Ends of planks must be supported by longitudinal steel girders. Plank joints must alternate. Transverse timber planks shall include sixteen feet (16- ft.) and eight feet (8- ft.) lengths or as approved by the Engineer.
10. Planks for longitudinal runners shall be a minimum of twelve feet (12- ft.) in length. Splice joints shall alternate for adjacent planks. A shorter length plank, in the center and at each end, shall be used to facilitate alternate joint construction.
11. Existing handrails that are damaged need to be repaired and rails need to be securely welded to the bridge structure. All existing handrails shall be coated with new epoxy paint (OSHA Safety Yellow color). Prior to coating surfaces, the surfaces shall be prepared in accordance with coating manufacture's recommendations and primed.
12. Existing gates and fencing must be re-installed on the bridge upon completion of the decking.

III. MEASUREMENT AND PAYMENT

Bidder shall complete the following Unit Price Schedule that will be used as a basis for comparing bids and for Measurement and Payment:

Unit Price Schedule

Bid Item	Description	Quantity	Unit	Unit Price
1.0	Mobilization	1	LS	\$
2.0	Remove existing timber decking	1	LS	\$
3.0	Remove and Replace Bearing Timbers at Bridge Abutments	1	LS	
4.0	New Bridge Decking	1	LS	\$
5.0	Repair Guard Railing	1	LS	\$
6.0	Demobilization	1	LS	\$
Project Total Cost				\$ _____
CONTINGENCY ITEMS				
7.0	Crane for performing repairs	1	Day	
8.0	Welding Machine	1	Day	
9.0	Crew Cost	1	Day	
10.0	Material Mark-up Rate	N.A.	%	
11.0	Crane Mobilization/Demob Cost	1	Ea.	

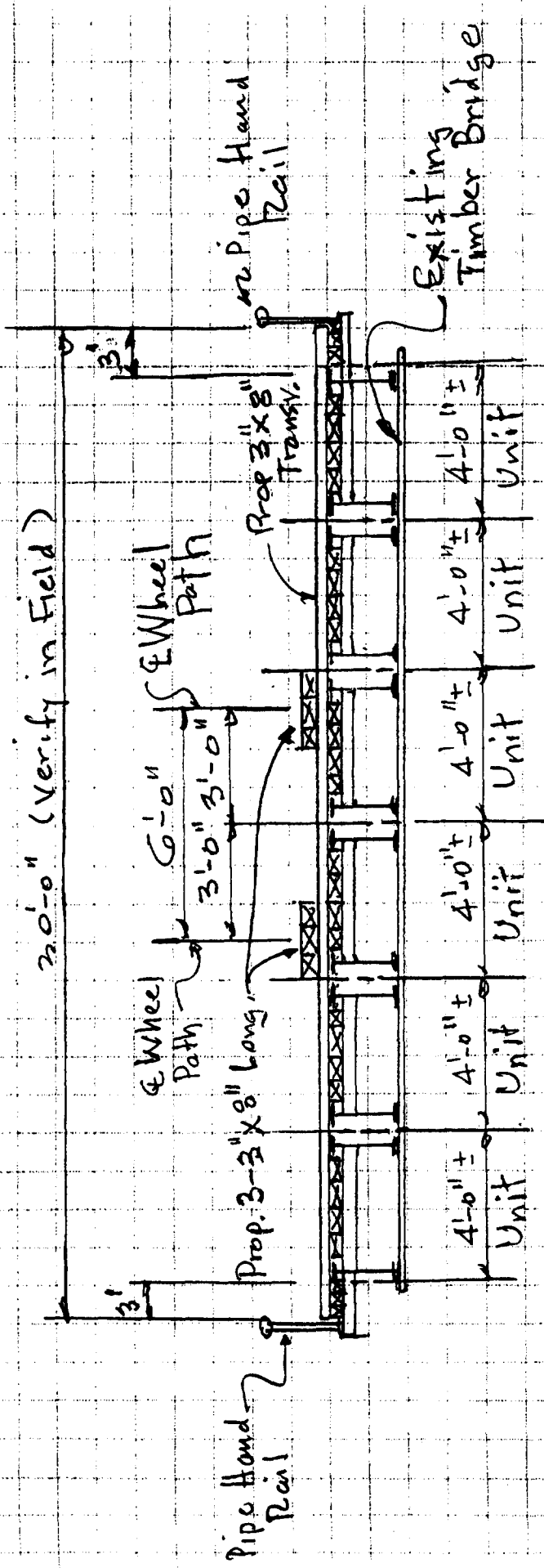
The Unit Price Schedule shall not be construed as an all inclusive list of the components of work to be performed. Items shown on the sketches and in the construction requirements, but not directly listed on unit price schedule shall be considered subsidiary to the Unit Price items. Contingency items are provided as a means for compensation for any extra work that may be required or requested by the Owner. ¹The crew cost shall include all supervision, tools, and transportation costs.

IV. SCHEDULE

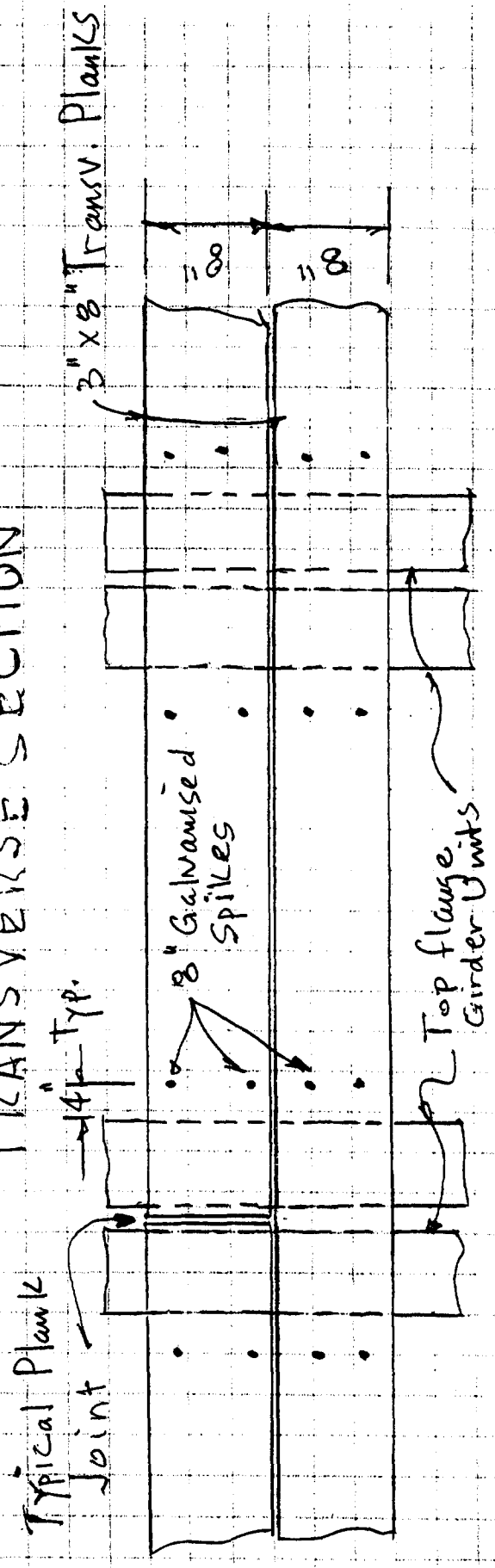
Work is anticipated to take no longer than one to two weeks. Contractor shall allow in his schedule a 48 hour shut-down period for inspection of the bridge beams by the Owner's Engineer after the bridge decking is removed. Contractor shall take this shutdown into consideration when developing unit prices. Contractor shall make no claims for compensation for delays during the planned shut-down for beam inspection.

V. SPECIAL CONDITIONS

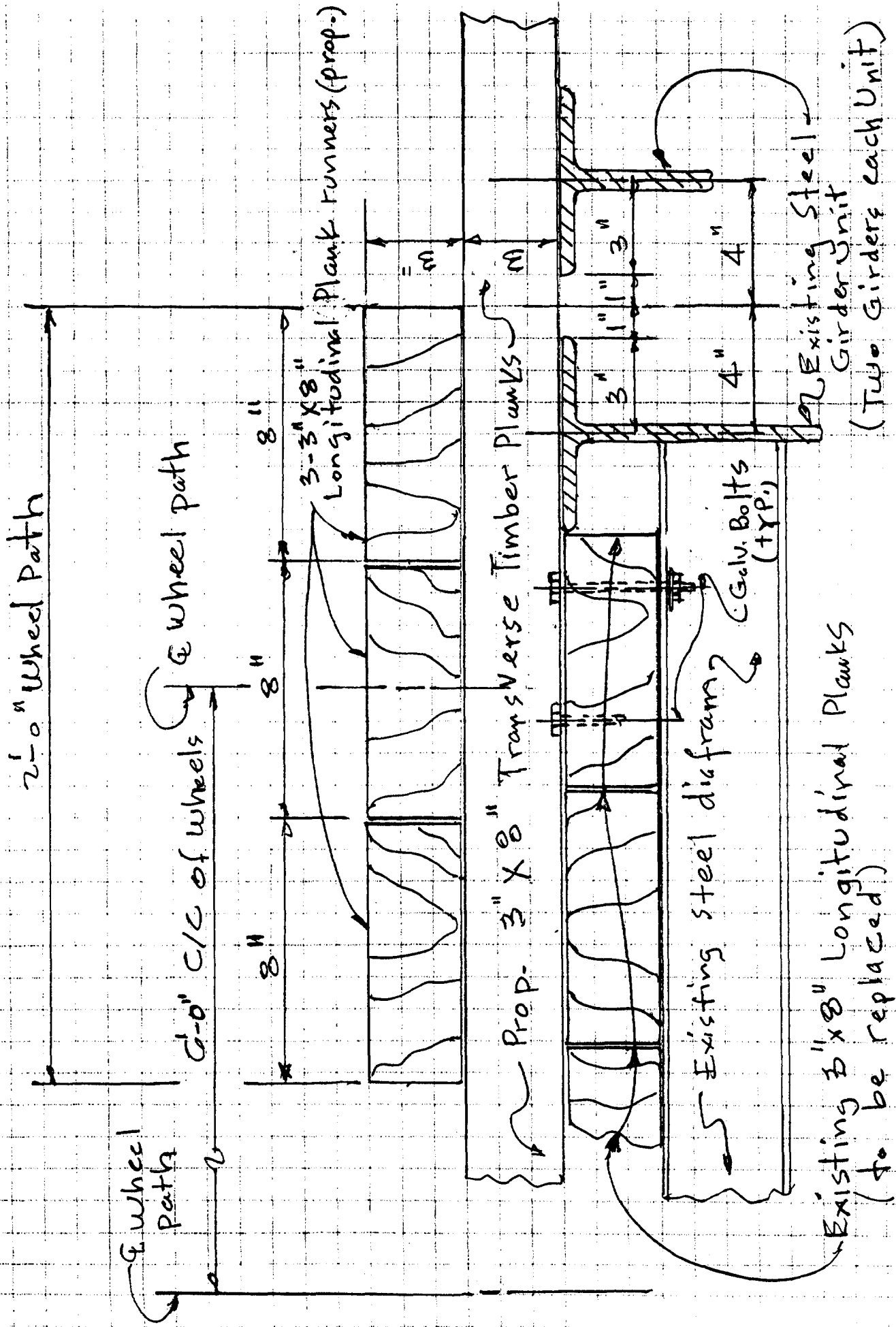
Contractor shall be aware that upon completion of bridge deck removal, and upon inspection of bridge beams by the Engineer, that conditions of the beams may warrant modifications or repairs to the bridge beams outside this scope of work. Owner may request to negotiate work outside of the scope using contingency unit prices or the Owner may elect to terminate the Contract for Convenience due to the findings of the inspection. If the Owner elects to terminate for Convenience, Contractor shall be paid the Unit Price for Demobilization, but shall make no claims for unanticipated profit for the remaining bid items that were not performed.



TRANSVERSE SECTION



PLAN VIEW
(Showing Plank Joint and Spike Pattern)



TRANSVERSE SECTION

Other equipment which will provide an acceptably clean surface may be used with prior approval of the Engineer.

485.4. Construction Methods. Minimum air pressure at the nozzle shall be 70 psi. Water pressure shall be normal hydrant pressure. The minimum sand nozzle opening shall be 1/4 inch.

High pressure water blast, with or without sand, will be permitted if it can be demonstrated to the satisfaction of the Engineer that the method will produce the required cleaning.

Wet sandblasting shall remove dirt, oil, curing compound, laitance, mortar and other materials to produce a surface satisfactory to the Engineer.

All blast debris shall be removed and placed in a disposal site approved by the Engineer.

485.5. Measurement and Payment. The work performed, materials furnished and all labor, tools, equipment and incidentals necessary to complete the work under this Item will not be measured or paid for directly, but will be considered subsidiary to the various bid items of the contract.

ITEM 490

TIMBER STRUCTURES

490.1. Description. This Item shall govern for the construction of all culverts, bridges, bulkheads, retaining walls, piers, bents, fenders, or any portion thereof which involves the use of timber materials whether treated or untreated. This Item shall not include temporary timber construction which is not a part of the finished work.

490.2. Materials. All materials used in the construction of timber structures shall conform to the requirements of Item 491, "Timber for Structures", or other pertinent specifications.

490.3. Preservative Treatment. Lumber and piling for Timber Structures shall be "Treated" or "Untreated" as shown on the plans. "Treated" lumber and piling shall be impregnated with the quantity of

Item 492, "Timber Preservative and Treatment", unless otherwise specified preservative and in the manner and by one of the processes specified in on the plans.

490.4. Storage of Materials. Lumber and timber at the site of the work shall be stored in piles.

Untreated material shall be open-stacked at least 12 inches above the ground surface and arranged to shed water and prevent warping. It shall be protected from the weather by suitable covering.

Treated timber shall be close-stacked, and arranged to shed water and prevent warping. It shall be protected from weather and sun by a suitable covering.

The ground underneath and in the vicinity of all material piles shall be cleared of weeds and rubbish.

490.5. Handling. Timber shall be handled carefully without sudden dropping, breaking of outer fibers, or bruising. The surface of treated timbers shall not be penetrated with tools. Treated timbers shall be handled with rope slings or other approved methods. Use of cant dogs, hooks, or pike poles will not be permitted.

490.6. Workmanship. Workmanship shall be first class throughout. Competent bridge carpenters shall be employed and all framing shall be true and exact. Nails and spikes shall be driven with just sufficient force to set the heads flush with the surface of the wood. Deep hammer marks in wood surfaces shall be considered evidence of poor workmanship.

All lumber and timber shall be accurately cut and framed to a close fit so that the joints will have even bearing over the entire contact surface. Mortises shall be true to size for their full depth and tenons shall make snug fit therein.

Countersinking shall be done wherever smooth faces are required.

490.7. Framed Bents. Mud sills of treated or untreated timber shall be of durable material as shown on the plans. They shall be bedded firmly and evenly to solid bearing and carefully tamped in place.

Concrete pedestals for the support of framed bents shall be finished carefully so that the sills or posts will take even bearing on them.

490.8. Sills. Sills shall have true and even bearing on piling or pedestals. When possible, all earth shall be removed from around sills so that there will be free air circulation around them.

490.9. Post Covers. The tops of posts in framed bents, if untreated material, shall be given a thick coat of hot tar, hot asphaltum, or hot coal-tar and covered with a sheet of 20 gauge galvanized metal as indicated on the plans. The cover shall measure at least 6 inches more in each dimension than the diameter or side of the post. The edges shall be bent down over the post and fastened with large headed galvanized nails or secured by binding with galvanized wire as indicated on the plans.

For treated materials, the tops shall be saturated thoroughly with hot creosote oil. These shall be covered with a coat of hot tar pitch over which shall be placed a cover as specified for untreated material above.

490.10. Caps. Timber caps shall be placed to secure an even and uniform bearing over the tops of the supporting posts or piling and to secure an even alignment of their ends. All caps shall be secured to the posts or piling in accordance with the details shown on the plans. No shimming on tops of piling or posts will be permitted.

490.11. Bracing. Sway bracing shall be placed diagonally on bents and connected to the cap and all piling or posts as shown on the plans.

Sash bracing and longitudinal bracing shall be placed and fastened to the piling or posts as shown on the plans.

Bracing shall be fitted to the bents in a satisfactory manner without dapping or cutting the posts or piling.

490.12. Stringers. Stringers shall be sized to uniform depth at bearings and shall be placed in a position so that knots near the edges will be in the top portion of the stringers.

Stringers may have butt joints or lapped joints as shown on the plans. The lapped ends of untreated stringers shall be separated at least one-half of an inch to permit the circulation of air. When stringers are two

panels in length, adjacent stringers shall be lapped at alternate bents. All stringers shall be fastened securely by bolts where shown on plans.

490.13. Bridging. Cross bridging or diaphragms between stringers shall be framed neatly and accurately and securely toe-nailed with at least two nails in each end.

Treated bridging need not be framed before treating, but the framed ends shall be given two coats of hot creosote oil before placing.

490.14. Flooring. Planks for single plank floors shall be placed with the heart side down with one-fourth of an inch openings between them for seasoned materials and with tight joints for unseasoned material. Unless otherwise provided, each plank shall be spiked to each stringer or nailing strip with not less than two spikes, the length of which shall be at least 3 inches greater than the thickness of the plank. The ends of the plank shall be cut off on a straight line parallel with the centerline of the roadway. The planks shall be selected carefully according to thickness and so laid that no two adjacent planks shall vary in thickness more than one-eighth of an inch.

Where double plank floors are indicated on the plans, the top course shall be laid diagonally or parallel to the centerline of the roadway as shown and, unless otherwise provided, each plank shall be spiked to the lower course at intervals of not more than 2 feet with two spikes, the length of which shall be at least 3 inches greater than the thickness of the plank. Joints shall be staggered at least 3 feet. Where the planks are placed parallel to or diagonally with the centerline of the roadway, special care shall be exercised to securely fasten the ends, and at the ends of the bridge, the ends of all planks shall be cut to a straight line parallel to the end of the bridge.

For laminated floors, the strips shall be placed on edge and at right angles to the centerline of roadway. The strips shall be full length. Random lengths will not be permitted. Unless otherwise provided, each strip shall be spiked to the adjacent strip at intervals of 2 feet, the spikes being staggered 8 inches in adjacent strips. The spikes shall be of sufficient length to pass completely through two adjacent strips and approximately half way through the third strip. In addition, unless otherwise provided, the strips shall be toe-nailed to the stringer with spikes not less than 4 inches in length. The toe-nailing of successive strips shall be staggered so that the spacing of spikes along each stringer shall be not less than 6 inches. For

strips 3 inches in thickness, spikes driven vertically through the strips and extending into the stringer not less than 3 inches may be substituted for toenailing, with the approval of the Engineer. Strips on steel stringers shall be secured to the stringers by one-eighth of an inch thick floor plates, slotted to fit the flange of the stringer and punched for two nails.

490.15. Wheel Guards. Wheel guards, as shown on the plans, shall be constructed on each side of the roadway.

490.16. Railings. Railings shall be constructed as shown on the plans. All connections shall be bolted wherever possible. Railings shall be so constructed that no two butt joints occur on the same post.

490.17. Cutting, Framing Holes for Bolts, Dowels, Rods, and Lag Screws. All cutting, framing and boring of treated timbers shall be done before treatment insofar as is practicable.

Holes for round drift bolts and dowels shall be bored with a bit one-sixteenth of an inch less in diameter than the bolt or dowel to be used. The diameter of holes for square drift bolts or dowels shall be equal to the least dimension of the bolt or dowel.

Holes for machine bolts shall be bored with a bit of the same diameter as the bolt.

Holes for rods shall be bored with a bit one-sixteenth of an inch greater in diameter than the rod.

Holes for lag screws shall be bored with a bit no larger than the root of the thread and shall be one-half of an inch deeper than the penetration of the lag screws.

All cuts, and drilled holes, in treated piling or timbers and all abrasions, after having been trimmed carefully, shall receive treatment as specified in Item 492, "Timber Preservative and Treatment".

490.18. Hardware. Machine bolts, drift bolts, and dowels may be either wrought iron or medium steel; washers may be O-gee cast or malleable iron, or they may be cut from medium steel or wrought iron plate, as specified.

Machine bolts shall have square heads and nuts unless otherwise specified. Wire nails and spikes shall be of steel, or circular cross section without taper, with a head and point, and of good quality. Boat spikes shall be of steel or wrought iron with forged heads and wedge-shaped points.

Washers of the size and type specified shall be used at all points where bolt heads and nuts would otherwise come in contact with wood. Cast washers shall have a thickness equal to the diameter of the bolt and a diameter of four times the thickness. For plate washers, the thickness shall be equal to one-half the diameter of the bolt, and the sides of the square shall be equal to four times the diameter of the bolt.

All bolt threads shall be properly checked after the final adjustment of the nuts. All bolt stock projecting beyond one-fourth of an inch from the top of the nut shall be removed.

All hardware, including nails, except cast iron washers, shall be galvanized in accordance with Item 445, "Galvanizing".

490.19. Painting. After completion of the structure, all bolt heads, threads, nuts, washers, and exposed portions of bolts shall be given a thorough coating of hot asphalt.

Railings shall be painted as provided on the plans. The materials and application shall conform to the requirements of Item 446, "Cleaning, Paint and Painting".

For untreated timber structures, the following surfaces shall be coated thoroughly with a thick coat of hot tar, hot asphaltum, or hot coal-tar creosote before assembling: the ends, tops, and all contact surfaces of pile caps; floor beam and stringer ends; joints and all contact surfaces of truss members; and laterals and braces. The back face of bulkheads and all other timber in contact with earth shall be coated thoroughly with one of the materials specified above.

490.20. Measurement and Payment. The work performed, materials furnished and all labor, tools, equipment and incidentals necessary to complete the work under this Item will not be measured or paid for directly, but will be considered subsidiary to the various bid items of the contract.

ITEM 491

TIMBER FOR STRUCTURES

491.1. Description. This Item shall govern for the materials for treated or untreated timber used in the construction of timber structures or portions of structures, as shown on the plans. This Item shall not include temporary timber construction which is not a part of the finished work.

491.2. Materials. Unless specified on the plans, the material shall be either southern pine or douglas fir, of the grades shown below. (Timber grade designations refer to standard designations of the Southern Pine Inspection Bureau and the West Coast Lumber Association.)

Group (1)

Stringers, caps, flooring posts, railing, wheel guards and fender timbers

SPECIES	SIZE OF MEMBER	GRADE
Southern Pine	2" Thickness	No. 1 Dense-1850F
Southern Pine	2-1/2" & Thicker	Dense Str.-72-1850F
Douglas Fir	2" to 4" Thick	Select Str.-1900F
Douglas Fir	5" and Thicker	Select Str.-1900F

Group (2)

Nailing strips, sway bracing, bulkhead plank, bridging, edging strips, cleats and blocks

SPECIES	SIZE OF MEMBER	GRADE
Southern Pine	2" Thickness	No. 1-1600F
Southern Pine	2-1/2" & Thicker	Dense Str. 65-1650F
Douglas Fir	2" to 4" Thick	Dense Constr.-1750F
Douglas Fir	5" and Thicker	Dense Constr.-1750F

The dressing of all timber shall be as indicated on plans or bills of material. Unless otherwise indicated, all strip flooring from 2 by 4 inches

to 3 by 6 inches in size shall be dressed S1S1E, full size, hit or miss. Under this requirement, all pieces which are more than one-eighth inch in excess of full nominal width or thickness, or more than one-quarter inch scant of full nominal width or thickness at any point, will be rejected.

491.3. Grading Requirements. Methods of grading and general requirements shall be in accordance with the "General Requirements for Stress Grades" as set forth in ASTM D245. All material shall bear the grade mark of an approved American Lumber Standards Committee agency or identification mark of a state approved inspection agency.

In the case where the timbers are to be treated, a grade mark, or identification mark must be on the timber before treating.

491.4. Treated Timber. Treated timber shall be impregnated with the type and amount of preservative specified, and by the process designated in Item 492, "Timber Preservative and Treatment".

491.5. Workmanship. Timber structures, whether treated or untreated, shall be constructed in accordance with the requirements of Item 490, "Timber Structures".

491.6. Timber For Sign Posts. Lumber for sign posts shall be Southern Pine, Number 1 small timbers, medium grain, air-dried, or kiln-dried before treatment. Compression wood is prohibited on any face. Such wood will be permitted if wholly enclosed in the piece, not less than six annual rings from the surface, and not over one-fourth inch wide in its maximum dimension. Sign posts shall have a preservative treatment as specified on the plans in accordance with Item 492, "Timber Preservative and Treatment".

~~491.7. Measurement. The quantities of timber of the various classifications used in the completion of the structure in accordance with the plans and specifications shall be computed in feet board measure on nominal sizes and the shortest commercial lengths practicable of use. The measurement shall not include timber used for erection purposes such as form, falsework and/or temporary bracing.~~

~~491.8. Payment. The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement"~~

~~will be paid for at the unit price bid per thousand feet board measure (MFBM) for "Treated Timber" or "Untreated Timber". This price shall be full compensation for all materials, hardware, equipment, tools, labor, painting, preservative treatment and incidentals necessary to complete the work.~~

The payment provided herein shall not be interpreted to include payment for timber piling, bituminous or concrete wearing surfaces, or other portions of the completed structures for which payment is provided elsewhere in the contract.

ITEM 492

TIMBER PRESERVATIVE AND TREATMENT

492.1. Description. This Item shall govern for the preservative, and for the seasoning, preparation and treatment of piles, posts, timbers and lumber when treatment is specified on the plans or called for in the specifications. Unless otherwise specified on the plans, the preservative and retention shall be as shown in Table 1 of this Item.

492.2. Materials. Except as otherwise provided herein, American Wood-Preservers' Association (AWPA) Standard Specifications shall govern for materials and methods of treatments, including seasoning, incising, preservatives, treatment and inspection for treatment. Pretreated stock will not be accepted unless, in the opinion of the Engineer, an emergency exists.

492.3. Paintability. When painting is required by the plans, timber products treated with oilborne preservatives shall be steam cleaned after installation.

492.4. Treatment of Cuts. When it is necessary to bore holes or to cut pressure treated materials after treatment, or when any treated surface is badly scarred, the hole, cut or scarred surface shall be given a multi-application of Copper Naphthenate solution as specified in AWPA Standard M4. The supplier of the timber products shall furnish suitable liquid preservative for field treatment upon request from the Engineer. The method of application to the damaged or cut areas shall be as specified in AWPA Standard M4.

492.5. Inspection. Inspectors representing the Department shall have access to all parts and facilities of plants used in the conditioning and treating of forest products. The supplier shall provide the necessary assistance for the proper inspection of the materials being furnished.

Table 1
MINIMUM NET RETENTION OF PRESERVATIVE

Product	Creosote (AWPA P1) Lbs. Per Cu. Ft.	Creosote Coal Tar Solution (AWPA P2) Lbs. Per Cu. Ft.	Penta- Chloro- phenol (AWPA P8 & P9) Lbs. Per Cu. Ft.	(1) ACA CCA (AWPA P5) Lbs. Per Cu. Ft.	Treating Specif- ications (AWPA Standard Specif- ication Numbers)
TIMBER PILING					C3
For Land or Fresh Water Use (Including Foundation Piles)					
Southern Pine	12 by Assay (0 to 3.0" Zone)		0.6 Dry Penta by Assay (0 to 3.0" Zone)		
Douglas Fir	17 by Assay (0 to 1.0" Zone)		0.85 Dry Penta by Assay (0 to 1.0" Zone)		
For Use in Coastal Waters					
Southern Pine	20 by Assay (0 to 3.0" Zone)	20 by Assay (0 to 3.0" Zone)			
West Coast Douglas Fir	20 by Assay (0 to 2.0" Zone)				C18

Product	Creosote (AWPA P1) Lbs. Per Cu. Ft.	Creosote Coal Tar Solution (AWPAP 2) Lbs. Per Cu. Ft.	Penta- Chloro- phenol (AWPA P8 & P9) Lbs. Per Cu. Ft.	(1) ACA CCA (AWPA P5) Lbs. Per Cu. Ft.	Treating Specif- ications (AWPA Standard Specif- ication Numbers)
GUARD FENCE POSTS-ROUND & RECTANGULAR					C14
Southern Pine	10 by Assay (0 to 1.0" Zone)		0.5 Dry Penta by Assay (0 to 1.0" Zone)	0.5 by Assay (0 to 1.0" Zone)	
POSTS FOR WIRE FENCE- ROUND					C5
Southern Pine	8 by Assay (0 to 1.0" Zone)		0.4 Dry Penta by Assay (0 to 1.0" Zone)	0.4 by Assay (0 to 1.0" Zone)	
TIMBER FOR SIGN POSTS	10		0.5	0.5	C14
BRIDGE TIMBERS & FENDER TIMBERS					C2
Southern Pine	8		0.4	0.4	
Douglas Fir	8		0.4	0.4	

Note: (1) ACA: Ammoniacal Copper Arsenite

CCA: Chromated Copper Arsenate

492.6. Identification. Each piece or bundle of treated-timber products shall bear a legible brand mark or tag indicating the name of the treater, date of treatment or lot number and the AWPAS Specification symbol to which the treatment conforms.

492.7. Treating Plants. Treating plants furnishing treated-timber products to the Department shall meet the requirements of AWPAS Standard M3 and shall be approved by the Department. A list of approved treating plants will be maintained by the Division of Materials and Tests.

492.8. Measurement and Payment. The work performed, materials furnished and all labor, tools, equipment and incidentals necessary to complete the work under this Item will not be measured or paid for directly, but will be considered subsidiary to the various bid items of the contract.

ITEM 495

RAISING EXISTING STRUCTURES

495.1. Description. This Item shall govern for raising existing structures as shown on the plans and in accordance with this Item.

495.2. Materials. All materials shall conform to the pertinent requirements of the following items:

- Item 420, "Concrete Structures"
- Item 421, "Portland Cement Concrete"
- Item 435, "Elastomeric Materials"
- Item 440, "Reinforcing Steel"
- Item 442, "Metal for Structures"

495.3. Construction Methods. Before starting the work of raising the structure, the Contractor shall submit to the Engineer for his approval detail plans bearing the seal of a Registered Professional Engineer, showing the method, materials, cribbing, falsework or other required supports, and equipment proposed for this Item of work. Such approval shall not relieve the Contractor of any responsibility for the successful completion of the work nor for any liability for replacement of damaged portions of the structure should the approved method result in damage to the structure. The Contractor shall be responsible for any damage caused by his operation